

Patent Application of
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for
PUTTER WITH ALIGNMENT MEANS

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FIELD OF THE INVENTION

The present invention relates to golf clubs and, more particularly to a putter with an alignment means that provides visual feedback during the setup and the stroke itself.

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BACKGROUND OF THE INVENTION

A putter is a golf club used on the short-surface of a golf course, called the green. The putter is used to strike the ball along the surface of the green into the hole; a golf shot known as the "putt".

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There are two critical phases in executing a proper putt. In order to putt accurately, the player needs to (a) achieve a proper stance and setup and to (b) properly execute the stroke.

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The proper stance for putting includes:

- 1) The player positioning his/her feet and body parallel to the aiming/putting line. This imaginary straight line goes from the center of the hole, to the center of the ball, on a flat, horizontal surface. On undulating greens, this straight line is aimed to the side of the hole.
- 2) Before the stroke is performed, the putter should be positioned towards the back of the ball, so that the face is square to/perpendicular to the aiming/putting line. Then the center line of the putter is in line with the aiming/putter line. The center line of the putter is an imaginary line, dividing the putter in two equal halves, from front/face to back.

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3) The putter should be placed behind the ball so that the ball is positioned on the center of the putter/face.

5 4) The players eyes should be positioned parallel to, and perpendicularly above (at an optimal height depending upon how tall the player is, or his particular putting style), the center line of the putter when the player is in position to perform the stroke (set up position).

10 Once the proper stance is achieved, the stroke must be executed. The correct/optimal stroke when using a pendulum-type putter is a "straight back - straight through" movement of the club head. During the stroke the player's head should not move.

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Because of the exacting nature of putting, several efforts have been made to design a putter with an alignment system to help improve putting accuracy. Examples of such putters include U.S. Pat. Nos. 5,720,668; 6,200,227; 6,261,190; and

20 6,663,496. These patents are representative of alignment systems that assist the player in achieving a proper stance, and include visual means that aid the player in confirming that his/her head is directly above the putter during set up. While these putters and other known putters may be somewhat
25 effective in aiding the player to position himself directly above the ball, none of these putters provide adequate visual feedback during the stroke itself. Nor do they take into consideration the effect of one's dominant eye on the visual feedback. There exists therefore a need for a putter that aids
30 the player in both of these critical phases.

BRIEF SUMMARY OF THE INVENTION

The present invention is a putter that provides reference markings for achieving a proper stance, as well as providing
35 visual feedback through the user's peripheral vision during the stroke itself. The reference markings of the putter aid the user in positioning his/her head directly over the ball,

the users' eyes are higher than intended, then the parallel lines will increasingly disappear behind the sidewalls. The putter can thus be custom calibrated for players of different height, or to the unique putting style of the individual.

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The top surface of the putter head further comprises a semi-circular marking of predetermined radius and offset that visually aids the user in centering the ball along the striking surface.

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The elliptical tracks of the putter also provide improved visual feed back during the stroke itself. When the user properly executes the putting stroke by moving the putter straight back and straight through (i.e. parallel to the putting/aiming line), the spacing and parallel appearance of the tracks imparts a sensation that can be described as "putting the ball in a tube". If the stroke deviates from the putting/aiming line, however, the user will receive immediate visual feedback. The user's peripheral vision will detect, as during the setup, that one of the tracks disappears while the other becomes increasingly curved. Because visual perception is extremely sensitive to deviations from straight lines and parallel relationships, the user will be able to detect errors in the putting stroke better than with other known putters.

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BRIEF DESCRIPTION OF THE DRAWINGS

FIG 1 is a perspective view of the putter head.

FIG 2 is a top view of the putter head.

FIG 3 is a top view, slightly in perspective, of the putter head.

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FIG 4 is a sectional view of the putter head taken along A-A of FIG 2.

FIG 5 is a sectional view taken along B-B of FIG 2.

FIG 6 is a graphical illustration of the formula for calculating the angle of incidence of the elliptical tracks, wherein "H" is the height from the eyes to the lowest point of arc, $w/2$ is the distance from the center line to the lowest point of arc, and X is the angle of incidence.

FIG 7a and 7b are exaggerated illustrations of a track machined into a straight and curved sidewall, respectively

FIG 8 is a perspective view of an alternate embodiment of the putter head

FIG 9 is a top view of the putter head from FIG 8, showing the visual effect in the case of misalignment

DETAILED DESCRIPTION OF THE INVENTION

The present invention is a putter head that improves putting accuracy. The following description is made with reference to a putter designed for a right-handed player wherein a hosel (not shown) will be provided at the appropriate location by one skilled in the art; however the invention may also be adapted for the left handed player by providing for an alternative location of the hosel by one skilled in the art.

The preferred embodiment shown in FIG 1-5 comprises a forward facing striking surface 10, a toe section 12, a heel section 14 (whereat a hosel will be provided for attachment of a shaft), a top surface 16 and a rearward-projecting tail section 18. As shown in FIG 1, tail section 18 comprises two vertical sidewalls 20, a floor section 22, a rear section 24 and a front wall section 26, said front wall section 26 being essentially the opposite face of striking surface 10. As can be appreciated from FIG 1, sidewalls 20, floor section 22, rear section 24 and front wall section 26 define a hollow cavity hereinafter referred to as targeting box 28. In a preferred embodiment, floor section 22 curves upward toward rear section 24, thus producing a rounded appearance at the

rear of tail section 18 as shown in FIG 4, providing clearance between the rear of tail section 18 and the ground during the follow-through of a putting stroke.

5 As shown in FIGs 1-5, an elliptical track 30 is machined into each of sidewalls 20, for example by using a grinding disc of appropriate radius. Tracks 30 are machined into sidewalls 20 at a predetermined angle of incidence "X" relative to the vertical plane extending upwards from the center line of the
10 putter, such center line being shown as A-A in FIG 2. Angle "X" is calculated based upon the optimal height of a user's eyes above the lowest point of arc of elliptical tracks 30. This optimal distance can be individually determined for each player (in the case of a custom putter), or may be based upon
15 accepted norms in the golfing art for players of various heights.

The formula for calculating angle "X" is graphically represented in FIG 6, wherein "H" is the height from the eyes
20 to the lowest point of arc, W/2 is the distance from the center line to the lowest point of arc (half the width of floor section 22), and X is the angle of incidence. According to the laws of right triangles, $\text{TANGENT } X = H/(W/2)$. In a preferred embodiment, the width of floor section 22 is
25 slightly less than the diameter of a golf ball, and more preferably 40 mm. If, for example, the optimal distance for a particular user from the eyes to the lowest point of arc were 1200mm, then, for that preferred embodiment, angle "X" would be 89.045 degrees.

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When tracks 30 are machined at the correct angle of inclination, a user that is positioned at the correct height, with his/her eyes in vertical alignment with center line A-A, will perceive tracks 30 as two parallel lines, as shown in FIG

2. (If tracks 30 were not machined at an angle, then the

~~lowest points of the arcs of the two tracks would appear~~
closer together than the ends of the arcs, due to the eyes
being relatively closer to the end points. The tracks would
5 then appear slightly curved.) In order to enhance this visual
perception the top surface of tracks 30 can be painted in a
color that contrasts with the color of the putter head. In a
preferred embodiment, the putter head will have a dark,
preferably black color, and tracks 30 will be painted a light

10 color, preferably white. Because tracks 30 are perceived as
parallel lines, the tracks provide an optical feedback if
user's head is misaligned. FIG 3 demonstrates how tracks 30
will be perceived by a user whose head is misaligned in the
direction of heel section 14. As seen, the uppermost track 30
15 will be perceived by the user as a curved line, and the
bottom-most track 30' will effectively "disappear" behind its
respective sidewall. This same visual feedback is provided
during the putting stroke, wherein it is desirable to keep the
putter head parallel with the aiming line. It is well known in
20 the optical arts that the human eye is particularly sensitive
to deviations from straight and parallel lines. The tracks
will thus provide a much more sensitive aid for the user than
previously known devices. The "sensitivity" of the invention
can be adjusted further if desired by for example increasing
25 or decreasing the relative height difference between the end
points of track 30 and the lowest point of arc (for example by
machining tracks 30 with a grinding disc of different radius).
An alternate method of increasing the "sensitivity" would be
to increase the height of sidewalls 20 at their midpoint, so
30 as to increase the distance from the tops of the sidewalls to
the lowest point of arc.

In order for tracks 30 to be perceived as parallel lines, it
is preferred that the tracks have a uniform width. In a

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preferred embodiment the width is 1.5mm, however this width can be increased or decreased in order to alter the "sensitivity" of the device. Because tracks 30 are machined into sidewalls 20 at an angle, the width of tracks 30 would not be uniform if sidewalls 20 are perfectly planar. If sidewalls 20 were planar, as depicted in exaggerated illustration 7a, the track at lowest point of the ellipse would have the full width but would increasingly become thinner and thinner towards the end points at the tops of the sidewalls. To compensate for this phenomenon, sidewalls 20 are slightly curved, as depicted in exaggerated illustration 7b. This allows for tracks 30 to be machined into sidewalls 20 at full thickness throughout their length.

- 15 As shown in the figures, the putter head according to the invention further comprises a semicircular indicator 32 engraved or imprinted on top surface 16, at the center line. Indicator 32 provides visual feedback aiding the user to center the striking surface with the ball (not shown). In a preferred embodiment, indicator 32 is white in color, and has a radius between 5.1mm and 5.9mm, and preferably 5.5 mm. Indicator 32 is offset in the forward direction by between 2.1mm and 2.9mm, and preferably 2.5mm. These particular dimensions and color have been shown to create a particularly effective optical illusion when striking surface 10 is positioned adjacent to the ball, whereupon indicator 32 appears to "melt into" the ball and effectively disappear. If the putter head is not correctly aligned, a gap will appear.
- 30 FIGS 8 and 9 show an alternate embodiment of the invention wherein each elliptical track 30 is replaced by two planar, upper tracks 34 and an intermediate, lower planar track 36. The visual feedback from this embodiment is illustrated in FIG

9, which shows the how the tracks are perceived by a user whose head is misaligned in the direction of heel section 14.

In another alternate embodiment (not shown) a curved strip of

5 appropriate material could be placed between sidewalls 20, and resting on tracks 30, so that one solid path/line is visible.

The same visual effect is achieved, but now with one solid, wide band, preferably in the same color as the ball.

10 While this invention has been shown and described with respect to specific embodiments thereof, it will be understood by those skilled in the art that various changes in form and detail thereof may be made without departing from the scope of the claims of the invention.

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